

# Macroeconomics II

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## Problem Set 4: Investment

### **Problem 1: Investment and Tobin's $q$**

Consider Tobin's  $q$ -theory from Lecture 3. Recall that the following two dynamic equations describe the partial equilibrium dynamics in the model

$$\Delta k_{t+1} = \frac{1}{\phi}(q_t - 1)k_t \quad (1)$$

$$\Delta q_t = \frac{1 - \beta}{\beta}q_t - f'(k_{t+1}). \quad (2)$$

- a) Draw a phase diagram in  $k$ - $q$ -space using equations (1) and (2).
- b) Assume the economy is initially in a steady state. How does a permanent (and positive) productivity shock affect the long-run values of  $k$  and  $q$ ? Use an appropriate diagram to describe the transitional dynamics to the new long-run equilibrium.
- c) Assume the economy is initially in a steady state. How does a permanent increase in  $\phi$  affect the long-run values of  $k$  and  $q$ ?